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Fastrack M1200 series
User Guide

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Overview

This document describes the hardware interface and the technical specifications of the Fastrack M1200 series modems:

- M1203 : EGSM/GPRS 900/1800 MHz version.
- M1213 : EGSM/GPRS 900/1900 MHz version.

These products are based on dual-band WISMO module and are GPRS class 2 capable.

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1 Product description

The Fastrack modem is small, fast, and efficient. It supports the transmission of:

- data
- fax
- short messages (Point to Point and Cell Broadcast)
- voice calls

The Fastrack modem is a Dual Band product using GSM 900/1800 MHz or GSM 900/1900 MHz and is GPRS class 2 capable. The basic elements you receive allow simple installation and operation of the modem. The package includes:

- 1 Fastrack modem M1203 or M1213
- 2 holding bridles
- 1 power supply cable
- 1 fuse
- 1 user guide

2 Product details

2.1 Physical characteristics

The Fastrack modem is small and lightweight. Following table contains information on the physical characteristics of the Fastrack modem.

Table 1: Physical characteristics of Fastrack modem

Dimensions	98 mm x 54 mm x 25 mm (excluding connectors)
Overall Dimensions	110 mm x 54 mm x 25 mm
Weight	<130 grams
Volume	13.23 cm^3
Housing	Aluminium

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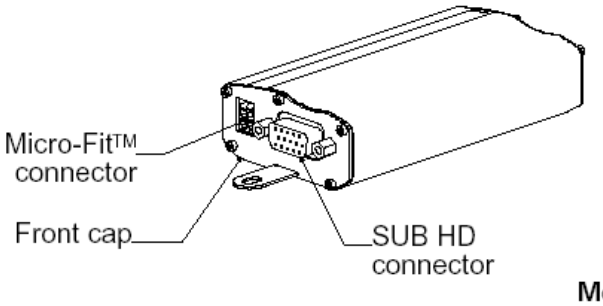

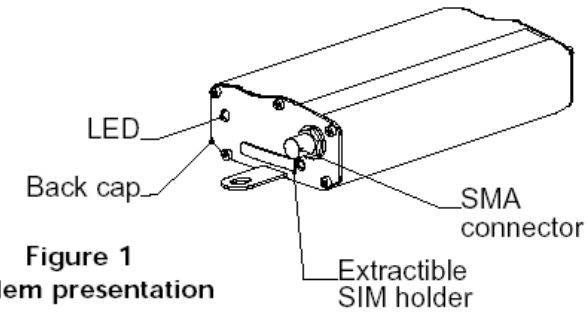

Figure 1
Modem presentation

Figure 1: Fastrack presentation

To ensure proper operation of the Fastrack modem, the operating environment must be within a specific temperature range as described in following table.

Table 2: Optimal operating and storage temperatures

Operating temperature range	-20°C to +55°C
Storage temperature range	-25°C to +70°C

2.2 Electrical characteristics

The Fastrack modem is permanently ON once you connect the power supply cable to a functional power supply (see Figure 2). Correct operation of the Fastrack modem is optimum in the following voltage range:

Table 3: Operating voltage

Operating voltage range:	5 to 32 V
Ground (0V)	0 V

The following table describes the consequences of overvoltage and undervoltage with the Fastrack modem:

Table 4: Effects of power supply defect

If the voltage:	Then the:
falls below 5 V (undervoltage)	communication is not guaranteed
continuously peaks above 32V (overvoltage)	modem is protected by the fuse power supply disconnects the electronic components from overvoltage
transiently peaks above 32 V (overvoltage)	modem guarantees its own protection

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As shown in Figure 2, the power supply cable is a tin copper wire with a:

- core of 24 mm x 0.2 mm
- cross-section of 0.75 mm^2

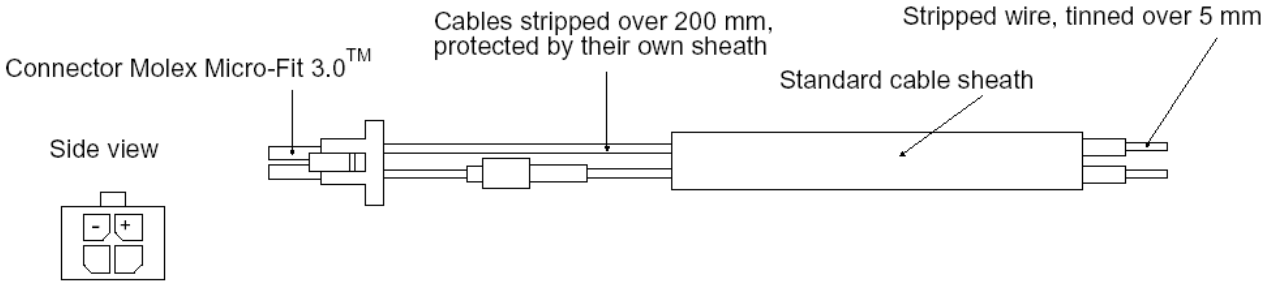

Figure 2: Diagram of power supply cable

2.2.1 Power Consumption

Following table provides information on power consumption of the Fastrack modem, assuming an operating temperature of +25 °C.

Table 5: Power Consumption

		EGSM 900			GSM 1800/1900			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Peak Supply Current	@ 5V			1.74			1.08	A
	@ 13.2V			0.73			0.41	A
	@32V			0.36			0.22	A
Input average supply current – communication mode	@ 5V			330			218	mA
	@ 13.2V			130			94	mA
	@32V			65			50	mA
Input average supply current – idle mode	@ 5V			31.4			31.4	mA
	@ 13.2V			13.2			13.2	mA
	@32V			5.6			5.6	mA
Input average supply current – idle mode with RS232 autoshutdown*	@ 5V			8.8			8.8	mA
	@ 13.2V			4.1			4.1	mA
	@32V			2.2			2.2	mA
Input average supply current – idle mode with full autoshutdown**	@ 5V			5.1			5.1	mA
	@ 13.2V			2.5			2.5	mA
	@32V			1.5			1.5	mA

* RS232 driver (MAX3238) automatically shuts down after 30s of inactivity on the serial link.

** RS232 driver in auto-shutdown and AT command

The power consumption might vary by 5% over the whole operating temperature range (-20°C to +55°C)

The tests are carried out with a 3V SIM card.

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2.2.2 Audio interface

The audio interface is available through the serial and control cable using a headset.

Electrical characteristics of the audio interface are available in the following table.

Table 6: Audio interface characteristics

For GSM 900/1800 and GSM 900/1900	Min	Typ	Max	Unit
Microphone input voltage @ minimum gain			43.8	mVrms
Speaker output voltage @ maximum gain			1.65	Vrms
Speaker Impedance	32			Ω

2.3 GSM features

Fastrack modem is GPRS Class 2 capable. Following table lists the features of the Fastrack modem.

Table 7: Features of Fastrack modem

MODE	DESCRIPTION
Audio	Half Rate / Full Rate / Enhanced Full Rate Accessories (options): handset and car-kit
Standard	Dual Band Extended GSM900 MHz Class 4 (2W) and GSM 1800/1900 MHz Class 1 (1W)
Interface	Serial interface RS232 V.24/V.28 Autobauding function AT command set based on V.25ter and GSM07.05 & 07.07
SMS	Mobile Originated (MO) and Mobile Terminated (MT) Mode Text & PDU point to point. Cell Broadcast In accordance with GSM 07.05
Data	Asynchronous 2400, 4800, 9600 and 14400 bps. Transparent and Non Transparent mode In Non Transparent Mode only: 300, 1200, 1200/75 bauds/ Mode 3.1 KHz (PSTN) and V110 (ISDN)
Fax	2400/4800/7200/9600 bps GSM teleservice 62 in transparent mode Class 2 Group 3 compatible
GPRS	Class 2 Coding schemes: CS1 to CS4 Compliant with SMG31bis

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2.4 Hardware interfaces

The hardware interfaces which exist for the Fastrack modem include the plugs, sockets, wires and the electrical pulses traveling through them in a particular pattern.

The Fastrack interfaces include:

- LED function
- External antenna (via SMA)
- Serial and control link (via 15 pins SUB D)
- Power supply (via 4 pins Micro-Fit™)
- SIM interface

2.4.1 Connectors

Refer to the following table for the connectors that exist for the Fastrack modem.

Table 8: Fastrack connectors

Connector	Function	Refer to
SMA	RF antenna connector	Figure 3
15 pins SUB D (high density)	RS232 link AUDIO link RESET	Figure 4
4 pins Micro-Fit™	Power supply connector	Figure 5
SIM connector	SIM card connection	Figure 6

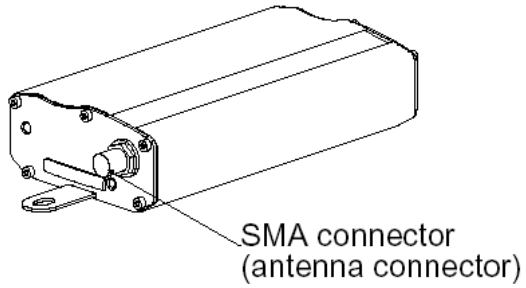

Figure 3: SMA connector

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2.4.1.1 SUB-D connector details

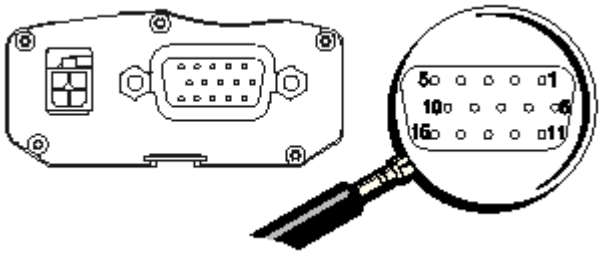

Figure 4: 15 pins SUB D connector (high density)

Table 9: Pins assignment for15 pins SUB D Connector

	PIN	EIA	CCIT	Designation
RS232	1	DCD	109	Data carrier detect
	6	RX	104	Receive data
	2	TX	103	Transmit data
	8	DTR	108.2	Data terminal ready
	9	GND		Signal ground
	7	DSR	107	Data set ready
	12	RTS	105	Request to send
	11	CTS	106	Clear to send
	13	RI	125	Ring indicator
Audio	4	Microphone (+)	Not applicable	
	5	Microphone (-)		
	10	Speaker (+)		
	15	Speaker (-)		
Reset	14	Reset		
	3	Reserved		

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2.4.1.2 Power supply connector

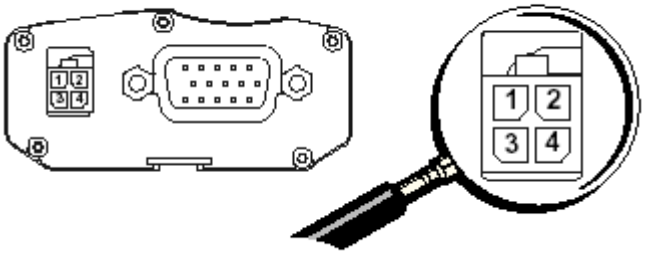

Figure 5: 4 pins Micro-Fit™ connector

Table 10: Pin assignment for Power Supply connector

Connector	Pins layout		Comments
4 pins Micro-Fit 3.0™	1 2 3-4	V+BATTERY GROUND AUXI	Power supply NC

Order the 4 pins Micro-Fit 3.0™ from the supplier, Molex

2.4.2 LED function

The LED lights indicate the operational status of the modem. Refer to following table for a list of the LED states.

Table 11: Operational states of Fastrack modem

MODEM is	LED light activity	Status of MODEM
ON	flashing slowly	idle mode connected to the network
	flashing rapidly	transmission mode
OFF	none	not connected to the network

2.4.3 External antenna

The external antenna connects to the modem via the SMA connector. Use an antenna with the characteristics listed in following table.

Table 12: External antenna characteristics

Antenna frequency range	dual band GSM 900/1800 MHz antenna for M1203 or dual band GSM 900/1900 MHz antenna for M1213 or triple band GSM 900/1800/1900 MHz antenna for M1200 series
Impedance	50 Ω
Gain (antenna + cable)	0 dBi
VSWR (antenna + cable)	-10 dB

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2.4.4 SIM interface

Fastrack modem requires Micro-SIM card and supports 3V and 5V SIM cards. The SIM interface of the Fastrack modem uses an extractible SIM card holder.

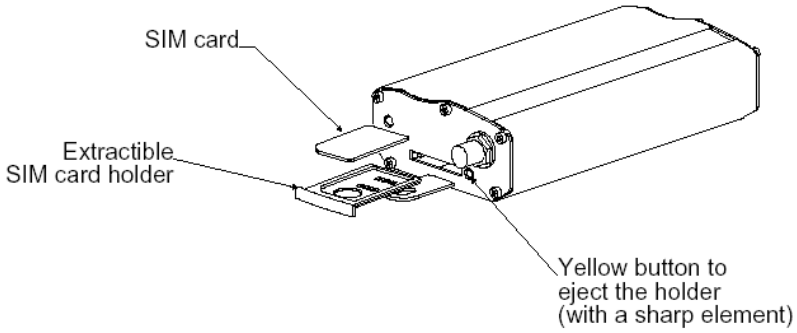

Figure 6: SIM card holder

3 Accessories

Following accessories are recommended with the Fastrack modem:

- Dual-band antenna: ALLGON 1140.26
- Antenna adaptor: SMA/FME adaptor from PROCOM
- Power adaptor (Europe): EGSTON N2 EFSW 12V 1A mounted with Micro-fit connector from MOLEX

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4 Testing the configuration of Fastrack

Following table contains AT commands. Use these commands to perform initial tests of the modem configuration.

Table 13: Testing Fastrack configuration

Task	AT commands	Module	Comments
Enter PIN Code	AT+CPIN=1234	OK	PIN Code accepted
		+CME ERROR: 16	Incorrect PIN Code (with +CMEE = 1 mode)
		+CME ERROR: 3	PIN already entered (with +CMEE = 1 mode)
Module synchro checking	AT+CREG ?	CREG=<mode>, 1	Modem synchronized on the network
		CREG=<mode>, 2	Synchronization lost, resynchronization attempt
		CREG=<mode>, 0	Modem not synchronized on the network, no synchronization attempt
Receiving an incoming call	ATA	RING	Answer the call
		OK	
Initiate a call	ATD1234;		Do not forget the « ; » at the end for voice calls
		OK	Communication established
		CME ERROR: 11	PIN code not entered (with + CMEE = 1 mode)
		CME ERROR: 3	AOC credit exceeded or a communication is already established
Initiate an emergency call	ATD112;	OK	Do not forget the « ; » at the end for voice calls
Communication loss		NO CARRIER	
Hang up	ATH	OK	
Store the parameters in E2P	AT&W	OK	Configuration settings are stored in E2P

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5 Getting started with Fastrack

5.1 Mounting Fastrack

To mount the Fastrack modem, do the following:

1. Place the modem at the desired location on the equipment.
2. Bind the modem to the equipment using the holding bridles. Refer to the following diagram.

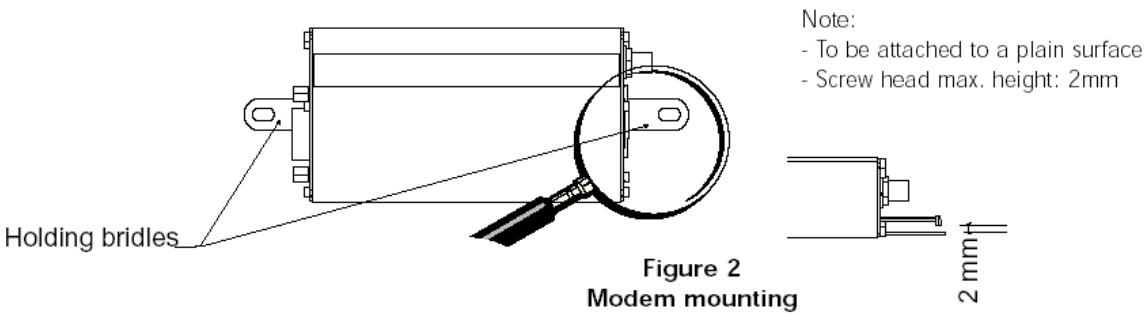

Figure 7: Fastrack mounting

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5.2 Installing Fastrack modem

The Fastrack modem requires the power supply connection to begin operation. It also requires a SIM card to operate on a GSM network. To install the modem, do the following:

1. Connect the power supply cable into the power supply, with a correct GND connection.
   Note for automotive application: according to the type of application, you can use permanent "+" (recommended) or key-switched "+".
2. Press the SIM card holder ejector (yellow button) with the tip of a pen or use another sharp object.
3. Insert the SIM card in the holder.
4. Verify that the SIM card fits in the holder properly.
5. Connect the antenna to the SMA connector.
6. Connect both sides of the serial and control cable (15-pin Sub D connector on the modem side).
7. Activate the power supply
8. Plug the power supply cable into the Fastrack modem.

   Note: Refer to Figure 1 for a general presentation of the Fastrack modem. Refer to Figure 6 for insertion of the SIM card.

5.3 Verifying signal strength

The Fastrack modem establishes a call if the signal is sufficiently strong. To verify the signal strength, do the following:

1. Using the Hyperterminal program, type the AT command AT+CSQ.

   Value appears for the received signal strength.
2. Verify the result with the following chart:

Value of signal strength (AT+CSQ response) (RSSI)	**Signal strength**
11 – 31	sufficient*
0 – 10	insufficient*
greater than 99	

* based on general observations

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5.4 Verifying network registration of the modem

1. Using the Hyperterminal program, type the AT command AT+CREG?.

   Value appears for the response.

2. Verify the result with the following chart:

Value	Network registration
0,1	Yes
0,5	Yes (registered roaming)

Note: If the modem is not registered, perform the procedure for 'Verifying signal strength' to determine the strength of the received signal.

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6 Troubleshooting failed transmission

This section of the document describes possible problems encountered when using the Fastrack modem and their solutions. To review other troubleshooting information, refer the 'FAQs' (Frequently Asked Questions) page at www.wavecom.com or use the following link:

http://www.wavecom.com/support/faqs.php

6.1 Receiving "no carrier" message

If the modem returns a message of **no carrier** upon an attempted transmission of data, or voice signals, then refer to following table for possible causes and solutions.

Table 14: Solutions for "no carrier" message

If the modem returns ...	Then ask ...	Action ...
no carrier	Is the selected bearer type is supported by the called party? Is the selected bearer type is supported by the network?	Type AT+CEER to view the extended error code (Refer to Table 15) Ensure that the selected bearer type is supported by the called party Ensure that the selected bearer type is supported by the network ensure that the semicolon (;) is typed immediately after the phone number In the AT command e.g. ATD######; type AT+CBST=0,0,3 Configure the SIM card for data/fax calls
	Is the received signal strong enough?	Refer to § 4 to verify the strength of the received signal
	Is the antenna properly connected?	Refer to Table 12 for antenna requirements

Refer to the AT commands manual for all codes and details.

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Table 15: Interpretation of extended error codes

Error Code	Diagnostic	Hint
1	Unallocated phone number	Not applicable
16	Normal call clearing	
17	User busy	
18	No user responding	
19	User alerting, no answer	
21	Call rejected	
22	Number changed	
31	Normal, unspecified	
50	Requested facility not subscribed	Check your subscription (data subscription available?)
68	ACM equal or greater than ACMmax	Credit of your pre-paid SIM card expired
252	Call barring on outgoing calls	Not applicable
253	Call barring on incoming calls	
3, 6, 8, 29, 34, 38, 41,42, 43, 44, 47, 49, 57, 58, 63, 65, 69, 70, 79, 254	Network causes	Call network provider See AT commands manual for further details

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6.2 Not connecting through the serial link

If the modem does not answer through the serial link upon an attempted transmission of data, or voice signals, then refer to following table for possible causes and solutions.

Table 16: Solutions for no connection through serial link

If the modem returns...	**Then ask...**	**Action...**
(nothing)	Is the modem powered correctly?	Provide a power supply in the range of 5 to 32 V
	Is the serial cable properly connected to the modem and PC sockets?	Connect the cable as shown in Figure 4 Verify reception and transmission
	Is the communication program properly configured?	Ensure the following settings for the modem: Data bits = 8 Parity = none Stop bits = 1 Baud = 9600 bps
	Is there another program interfering with the communication program?	Close the application e.g. mouse or printer driver

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6.3 Receiving "error" message

If the Fastrack modem returns a message of **error** upon an attempted transmission of data, or voice signals, then refer to following table for possible causes and solutions.

Table 17: Solutions for "error" message

If the modem returns...	Then ask...	Action...
error	Is the modem registered on the network?	Refer to § 5.4 to verify that the modem is registered on the network
	Is the modem receiving an incoming call or is it already in communication?	End any communication using the ATH command
	Is the selected bearer type is supported by the called party? Is the selected bearer type is supported by the network?	Type AT+CMEE to view the extended error code Note: Refer to Table 18 Ensure that the selected bearer type is supported by the called party Ensure that the selected bearer type is supported by the network Ensure that the semicolon (;) is typed immediately after the phone number In the AT command e.g. ATD######;
	Is the received signal strong enough?	Refer to § 4 to verify the strength of the received signal
	Is the antenna properly connected?	Refer to Table 12 for antenna requirements

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Table 18: Interpretation of extended error codes

Error Code	Diagnostic	Hint
0	Phone failure	Call technical support
3	Operation not allowed	No action
4	Operation not supported	
10	SIM not inserted	Do one of the following: Insert the SIM card in the SIM holder of the modem Check that the SIM card is clean and properly inserted into the holder
11	SIM PIN required	Enter PIN code
12	SIM PUK required	Enter PUK code Note: Call your network provider if you do not know this code.
13	SIM failure	Check validity of your SIM card. If SIM damaged, call your network provider
16	Incorrect password	Check the code you entered
17	SIM PIN2 required	Enter PIN2 code
18	SIM PUK2 required	Enter PUK2 code Note: Call your network provider if you do not know this code.
26	Dialing string too long	Check the phone number (max. 20 digits)
30	No network service	No action
32	Network not allowed – emergency calls only	No action
40	Network personalization PIN required (Network lock)	Enter the Network lock Note : Call your network provider if you do not know this code.
103	Illegal MS (#3)	No action
106	Illegal ME (#6)	No action
107	GPRS services not allowed (#7)	Contact your network provider to subscribe to the GPRS service
111	PLMN not allowed (#11)	No action
112	Location area not allowed (#12)	No action
113	Roaming not allowed in this location area (#13)	No action
132	service option not supported (#32)	Check the service option
133	requested service option not subscribed (#33)	Call your network provider to subscribe to the requested service option
134	service option temporarily out of order (#34)	No action
149	PDP authentication failure	Call your network provider to know the right authentication parameters
150	invalid mobile class	Change the class of the mobile to a valid one
148	unspecified GPRS error	No action

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7 NOTES ON SAFETY

7.1 General Safety

It is important to follow any special regulations regarding the use of radio equipment due to the possibility of radio frequency, RF, interference. Please carefully follow the safety advice given below:

- Switch OFF your GSM Modem when in an aircraft. The use of cellular telephones in an aircraft may endanger the operation of the aircraft, disrupt the cellular network and is illegal. Failure to observe this instruction may lead to suspension or denial of cellular telephone services to the offender, or legal action or both.
- Switch OFF your GSM Modem when at a refueling point.
- Switch OFF your GSM Modem in hospitals and any other place where medical equipment may be in use.
- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or where blasting operations are in progress.
- There may be a hazard associated with the operation of your GSM Modem close to inadequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufacturers of the medical device to determine if it is adequately protected.
- Operation of your GSM Modem close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers recommendations.

The modem is designed for and intended to be used in fixed and mobile applications.
Fixed means that the device is physically secured at one location and is not able to be easily moved to another location.
Mobile means that the device is designed to be used in other than fixed locations and generally in such a way that a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter's antenna and the body of the user or nearby persons.

The Modem is not designed for or intended to be used in portable applications (within 20cm of the body of the user) and such uses are strictly prohibited.

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7.2 Vehicle Safety

Follow these guidelines for use of the modem in an automobile:

- Do not use your GSM Modem while driving, unless equipped with a correctly installed vehicle kit allowing 'Hands-Free' Operation.
- Respect national regulations on the use of cellular telephones in vehicles. Road safety always comes first.
- If incorrectly installed in a vehicle, the operation of GSM Modem telephone could interfere with the correct functioning of vehicle electronics. To avoid such problems, ensure that the installation has been performed y a qualified personnel. Verification of the protection of vehicle electronics should form part of the installation.
- The use of an alert device to operate a vehicle's lights or horn on public roads is not permitted.

7.3 Maintenance of GSM modem

Your GSM Modem is the product of advanced engineering, design and craftsmanship and should be treated with care. The suggestions below will help you to enjoy this product for many years.

- Do not expose the GSM Modem to any extreme environment where the temperature or humidity is high.
- Do not attempt to disassemble the GSM Modem. There are no user serviceable parts inside.
- Do not expose the GSM Modem to water, rain or spilt beverages, It is not waterproof.
- Do not abuse your GSM Modem by dropping, knocking, or violent shaking. Rough handling can damage it.
- Do not place the GSM Modem alongside computer discs, credit or travel cards or other magnetic media. The information contained on discs or cards may be affected by the phone.
- The use of third party equipment or accessories, not made or authorized by Wavecom may invalidate the warranty of GSM Modem.
- Do contact an authorized Service Center in the unlikely event of a fault.

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7.4 Your responsibility

This GSM Modem is under your responsibility. Please treat it with care respecting all local regulations. It is not a toy

Therefore, keep it in a safe place at all times and out of the reach of children.

Remember your Unlock and PIN codes. Become familiar with and use the security features to block unauthorized use and theft.

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8 General information

8.1 GSM reference documents

GSM 03.40, GSM 03.45, GSM 04.11,

GSM 04.21, GSM 05.08, GSM 07.01,

GSM 07.02, GSM 07.05, GSM 07.07.

8.2 ETSI contact

ETSI Secretariat

F-06921 Sophia Antipolis Cedex, France

e-mail: secretariat@etsi.fr

8.3 Service

The AT commands manual is available from your local modem supplier.

8.4 Disclaimer

Modem and GSM-unit specifications and manuals are subject to change without notice. Wavecom assumes no liability for damage incurred directly or indirectly from errors, omissions or discrepancies between the modem or GSM-unit and their manuals.

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